

REMARKS

Claim 1 has been amended, and claims 2-8 remain dependant on claim 1. Claims 9 and 10 were previously canceled. Claims 11 and 12 are new. Accordingly, claims 1-8, 11 and 12 remain in this application for examination.

Claim Rejections Under 35 U.S.C. §103(a):

Applicants traverse the rejection of claims 1-8 as being obvious over Huhn (U.S. 2001/0016267, referred to hereafter as Huhn). In order to clarify patentable subject matter over Huhn, claim 1 has been amended. Accordingly, Applicants respectfully believe that the rejection should be withdrawn and the claims allowed.

Claim 1, as amended, recites a composite multilayer material having a backing layer, a bearing metal layer, an intermediate layer and an overlay. The overlay has about 0 - 20 wt.% of at least one of copper or silver, the rest being tin. The intermediate layer is a single layer of nickel having a thickness greater than 4  $\mu\text{m}$  as applied to said bearing metal layer, with the intermediate layer being in direct contact with the bearing metal layer and the overlay for diffusion of a portion of the single layer of nickel directly into the overlay.

As detailed in the previous response, Huhn does not disclose nor suggest a multilayer material having a single intermediate layer of nickel having a thickness greater than 4  $\mu\text{m}$  arranged in direct contact with an overlay and a bearing metal layer. Rather, Huhn discloses a bearing metal layer 1 applied to a steel backing layer, with a first intermediate layer 2 of nickel applied to the bearing metal layer; a second intermediate layer 3 of nickel-tin applied to the first intermediate layer 2, and an overlay 4 of a tin matrix 5 applied to the second intermediate layer 3. The second intermediate layer 3 is instrumental in providing the bearing material with an increased service life by facilitating diffusion of tin from the overlay into the second intermediate layer and also facilitating diffusion of nickel into the second intermediate layer (paragraph [0048]). Accordingly, the pure nickel layer 2 of Huhn is not in direct contact with the overlay 4, as claimed by Applicants, but rather is blocked from the overlay 4 by the instrumental second intermediate layer 3 of nickel-tin. The first intermediate layer 2 of nickel is preferably from 1 to 4 $\mu\text{m}$  (paragraph [0030]) in order to maintain the ratio of nickel-tin in

the second intermediate layer in approximately an atomic ratio of 1:1 by diffusion of some of the nickel of the first intermediate layer 2 into the second intermediate layer and diffusion of tin from the overlay 4 into the second intermediate layer 2. **Accordingly, the thickness of the first intermediate nickel layer 2 contributes to the equilibrium-determined growth of the second intermediate tin-nickel layer 3, in that the tin-nickel layer 3 is fed with tin from the overlay 4 and with nickel from the first intermediate layer 2.** As such, the 1:1 ratio of tin to nickel in the second intermediate tin-nickel layer is maintained (paragraph [0030]).

In contradistinction to the Examiner's opinion that one ordinarily skilled in the art would be directed to incorporate a single intermediate layer of nickel having a thickness greater than 4 $\mu$ m between an overlay and an underlying bearing metal in view of the 1-4 $\mu$ m first intermediate layer with the statements made in paragraphs [0008] that make mention to a nickel intermediate layer used as a diffusion barrier, Applicants contend that one having ordinary skill in the art would not be directed toward Applicants' claimed bearing multilayer material without use of improper hindsight. In paragraphs [0008] and [0009], Huhn sets forth the stage for the improved dual intermediate layer material construction by expressly stating that multilayer bearing materials having a single intermediate layer of nickel acting as a diffusion barrier between the overlay and the bearing metal exhibit low hardness with only limited load carrying capacities. Beyond this, there is no disclosure or suggestion in Huhn that the single intermediate layer of nickel have a thickness greater than 4 $\mu$ m, as claimed by Applicants. Applicants have addressed this starting in the first paragraph on page 5 of the present application, where it states that thicker intermediate layers of nickel are avoided as they do not provide good sliding, and are intended, if necessary, to allow wear quickly to reach the underlying bearing metal. As such, one skilled in the art would not be directed by Huhn to provide a single intermediate layer of nickel having a thickness greater than 4 $\mu$ m arranged in direct contact with the bearing metal and the overlay.

Further yet, Applicants disagree with the proposition that there is no justification in Applicants' disclosure for distinguishing between a single intermediate layer of nickel having a thickness of less than 4 $\mu$ m versus one having a thickness greater than 4 $\mu$ m. First off, Applicants disclosure clearly acknowledges the prior art (EP1113180, corresponding to Huhn, now issued as US Pat. No. 6,492,039, and assigned to Applicants' assignee)

**Appln. No.: 10/568,110**  
**Reply to Office action of January 23, 2008**

having the dual intermediate layers, one of nickel with a thickness of 1-4 $\mu$ m and the other of tin-nickel, wherein the two layers cooperate to provide a system which adapts itself to an applied load, wherein the load carrying capacity is increased via growth of the tin-nickel layer. However, the disclosure of Huhn does not direct one to Applicants' claimed multilayer bearing material. As noted on page 5 of Applicants' disclosure, the nickel intermediate layer must be greater than 4 $\mu$ m in order to avoid complete consumption of the nickel layer via diffusion of the nickel layer into the tin of the overlay. This in turn would lead to detachment of the top layers, now consisting of tin-nickel from the bearing metal layer. Accordingly, there is ample support within Applicants' disclosure to patentably distinguish the claimed single nickel intermediate layer having a thickness greater than 4 $\mu$ m over Huhn.

Accordingly, Applicants believe amended claim 1 to define patentable subject matter and to be in proper form for allowance. Such action is respectfully requested.

Claims 2-8 are ultimately dependant upon amended claim 1, and thus, are believed to define patentable subject matter for at least the same reasons and to be in proper form for allowance. Such action is respectfully requested.

**New Claims**

Claims 11 and 12 have been added, and patentably distinguish a method of forming a tin-nickel layer in a composite multilayer material and a method of constructing a composite multilayer material, respectively. Each method includes providing a single intermediate layer of nickel having a thickness greater than 4 $\mu$ m in direct contact with an overlay and a bearing metal layer. As discussed above with regard to amended claim 1, neither Huhn nor any of the other applied references disclose or suggest such a multilayer material.

Accordingly, Applicants believe new claims 11 and 12 to define patentable subject matter and to be in proper form for allowance. Such action is respectfully requested.

**Appln. No.: 10/568,110**  
**Reply to Office action of January 23, 2008**

It is believed that this application now is in condition for allowance. Further and favorable action is requested.

The Patent Office is authorized to charge or refund any fee deficiency or excess to Deposit Account No. 04-1061.

Respectfully submitted,

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Date

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